INITIAL TRAINING CURRICULUM

KY Required Mandatory Supplemental Curriculum for Emergency Medical Technician Basic (EMT-B) Initial Training in the Monitoring, Maintaining and Discontinuing of Preestablished Patient Intravenous Infusions in Prehospital, Interfacility and Facility to Home Encounters

INSTRUCTOR MANUAL

Instructions for the EMT-B Student Preparatory to Meeting the Scope of Practice and Requirements for KY EMT-B Certification

Kentucky Board of Emergency Medical Services
Pursuant to 202 KAR 7:060 and 7:080

This curriculum relates to the Department of Transportation (D.O.T.) 1994 EMT Basic National Standard Curriculum from the Module 4 Medical Emergencies (infections or diseases resulting in dehydration, etc.) and the Module 5 Trauma (control of bleeding and shock) components. It is designed as a KY required Supplemental curriculum referenced in 202 KAR 7:060 and 7:080.

OVERVIEW

This is a curriculum Module designed to instruct Emergency Medical Technician Basic (EMT-B) students in monitoring, maintaining and discontinuing of preestablished patient intravenous infusions encountered in the pre-hospital setting for patient emergency medical ambulance transportation; or for monitoring, maintaining and discontinuing of limited types of I.V. infusions encountered during interfacility ambulance transportation, or for facility to home ambulance transportation of stable patients whose needs may be met by Basic Life Support (BLS) (EMT-Basic) certified personnel. Performance of the skills shall be ambulance service specific.

This curriculum is a mandatory, KY required Module to be included in KY EMT-B initial training courses commencing with the effective date of 202 KAR 7:060 and 7:080. For an EMT-B to obtain training through continuing education, this curriculum, or an equivalent curriculum, that has been submitted to, reviewed and recommended to the Kentucky Board of Emergency Medical Services for approval, is to be used. Training through continuing education is for a person who received their initial EMT-B training prior to the introduction of this curriculum as a regulatory requirement in a KY EMT-B initial training course.

PART ONE

PREHOSPITAL ENCOUNTERS
Ambulance Transportation of the Patient to a Hospital
- (Emergency Ambulance Transport) -

Introduction

This portion of the curriculum Module is designed:

1. For the EMT Basic student, when certified to practice:

   (a) Who will be working for an ambulance service licensed at a minimum of the BLS level and the service may not be required to have a physician medical director in order for the EMT-B to perform prehospital patient care and ambulance transportation of a patient with a preestablished intravenous (I.V.) infusion;

   (b) Who will respond to a prehospital request for emergency medical ambulance transportation of a patient who has a preestablished I.V. infusion in place; and

   (c) Who understands the presence of the pre-established I.V. is usually not the "chief complaint" or reason the patient requires emergency medical care and ambulance transportation to a hospital.

2. So that the location of the infusion site and the type of fluid being administered will not be factors in whether or not the EMT-B will transport the patient from the prehospital scene to the receiving hospital (e.g., the EMT-B is authorized to transport the patient regardless of the location of the I.V. site or type of I.V. fluid being administered);

3. To provide instruction related to the monitoring, maintenance and discontinuation of whatever fluid is being administered;

4. To emphasize that in most cases, **except where an adverse situation dictates otherwise**, the EMT-B shall transport the patient with the preestablished I.V. as found and as safely as possible to the receiving hospital without changing or stopping the fluid flow nor removing the I.V. catheter from the patient (**closing the control clamp may be the only intervention if an adverse condition occurs and it cannot be corrected**);

5. So that whenever feasible, the home caregiver who is trained in the monitoring, maintaining and discontinuing of the I.V. will accompany the patient to the receiving hospital;

6. So that if the home caregiver is not available, or it is not feasible for this person to accompany the patient, the EMT-B shall not change the fluid flow rate and no identical infusion solution shall be added to the infusion line. **In exception, if the ambulance service is contracted for physician Medical Director supervision and the infusion solutions in the prehospital encounter are limited to those of this curriculum identified in the Interfacility Encounters portion of this module , the EMT-B may change the fluid rate if needed and add identical infusion solution to the infusion line**;

7. So that maintenance of the infusion solution will include monitoring of the patient for signs and symptoms of adverse conditions;

8. So that training will be included in how to recognize circumstances whereby it may be necessary to notify an on-line medical control physician; and

9. So that **discontinuation means only to close the control clamp**.

NOTE* Planning for **prescheduled, prehospital nonemergency** care and transportation of a patient having a preestablished I.V. (e.g., a routine doctor office visit) requires other considerations regarding liability and patient care issues. In a nonemergency situation the EMT-B and the ambulance service are agreeing to meet the needs of the patient, including monitoring and maintenance of the I.V. If the **transporting ambulance** service has no physician medical director and the I.V. relates to the need for possible adjustment of the flow rates, or the I.V. solution may require Advanced Life Support personnel supervision or intervention, this is beyond the EMT-B scope of practice.

******* Completion of training in this portion of the curriculum module by an EMT-B *******
who is working for a BLS ambulance service having no physician medical director does not authorize the EMT-B to "maintain or discontinue" an I.V. for a patient during an <u>interfacility</u> or a <u>facility to home</u> transport. In order to perform interfacility and facility to home transports, the EMT-B shall have successfully completed the training in the **Interfacility and Facility to Home Encounters** portion of this curriculum module. **Additionally, the EMT-B shall be employed with an ambulance service <u>contracted with a physician medical director</u>.**

OBJECTIVES:

Cognitive

The EMT-Basic student shall be able to:

1. List the three (3) most common sizes of I.V. fluid containers;
2. List the most common type (structural material) of I.V. fluid container;
3. List the definition of a macro drip I.V. administration set;
4. List the definition of a micro drip I.V. administration set;
5. List two (2) of the most common types of catheters utilized in the administration of I.V. fluids;
6. List five (5) of the most common sizes of needles/catheters utilized in the administration of I.V. fluids;
7. List four (4) of the most common signs and symptoms associated with infiltration;
8. List two (2) common causes associated with a potential air embolism;
9. List six (6) common causes associated with alteration (decreased and increased) in the flow of I.V. fluids;
10. List a minimum of one (1) item of personal protective equipment to be utilized during ambulance transportation of a patient with a preestablished I.V;
11. List the main reason for maintaining the I.V. fluid container at the appropriate height in relation to the position of the patient;
12. List two (2) situations in which it may be necessary for the EMT-B to notify an on-line medical control physician; and
13. List five (5) items to be documented on the patient run report related to the monitoring, maintenance and the discontinuation of preestablished I.V. fluids.

Psychomotor

The EMT-Basic student shall be able to:

1. Demonstrate the appropriate technique for closing the control clamp on the I.V. tubing for discontinuation of the I.V. infusion flow.
2. Demonstrate, the appropriate procedures in the following situations when the catheter has been accidentally dislodged:
    a. Technique for bleeding control at the I.V. site
    b. Technique for application of a dressing and bandage to the I.V. site
    c. Disposal of the I.V. set and accessories; and
3. Demonstrate appropriate documentation of five (5) items on the patient run report related to monitoring, maintenance and the discontinuation of preestablished I.V. fluids.

PREPARATION:

Motivation:

Because of the wide use of patient intravenous (I.V.) infusions and the variety of reasons for I.V. uses in patient treatment, it is advantageous for an EMT-Basic:

(1) to be able to recognize when they have encountered a preestablished patient I.V. infusion; and

(2) **to be able to monitor, maintain and discontinue the I.V. appropriately during the time the EMT-B has assumed responsibility of the patient during ambulance transportation**.

The presence of a preestablished I.V. is vital for patient care as a means to provide drug treatment, and to replace patient body fluid losses due to acute illnesses or trauma.

Because of the frequency with which the EMT-B is likely to encounter a pre-established patient I.V. infusion, the EMT-B can improve patient outcomes by obtaining knowledge and skills within their scope of practice to extend their capabilities in caring for a patient.

Prerequisites:

BLS, Preparatory, Airway, Patient Assessment, Medical Emergencies and Bleeding and Shock Control

WORK ENVIRONMENT:

For **Prehospital Encounters**, the minimum BLS licensed ambulance service may not be required to have a written agreement with a physician Medical Director. **For Interfacility and Facility to Home ambulance transportation, the EMT-B shall be employed with an ambulance service having a written agreement with a physician Medical Director.**

PERSONNEL:

Lead Instructor Qualifications:

Minimum, KY EMT-B Instructor who has successfully completed equivalent training and is knowledgeable and has demonstrated proficiency of the skills related to this module. If an adjunct faculty is called upon to teach the any portion of this module, the person shall be provided with a copy of this curriculum in advance of the lesson. This curriculum, which has been reviewed and recommended by the Kentucky Board of Emergency Medical Services, shall be utilized in preparation and planning to assure instruction is kept within the EMT-B scope of practice.

Assistant Instructor Qualifications:

Minimum, KY EMT Basic who has completed this or equivalent training by use of an approved curriculum.

Individuals used as an assistant instructor for the prehospital encounter portion shall be knowledgeable and shall have demonstrated proficiency in the skills related to the monitoring, maintaining and discontinuing of patient preestablished infusions in prehospital encounters. The assistant for the interfacility and facility to home portion of this curriculum shall have completed equivalent training and shall be knowledgeable and shall have demonstrated proficiency in the skills related to monitoring, maintaining and discontinuing patient preestablished I.V**.** infusions in interfacility and facility to home encounters.

RECOMMENDED MINIMUM TIME TO COMPLETE:

Four (4) hours, which includes a minimum of two (2) hours for the Prehospital Encounters Portion and two (2) hours for the Interfacility and Facility to Home Encounters portion of this module. Lecture and skill practice sessions are intregal components of this curriculum.

MATERIALS:

AV Equipment:

Utilize various audio-visual materials relating to the monitoring, maintenance and discontinuation of a preestablished patient I.V. infusion limited to the EMT-B scope of practice described within this curriculum. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the program. Materials should be edited to assure meeting the objectives of the curriculum.

Printed Materials for Student Reference:

In that this is a KY required Supplemental curriculum and it is not addressed in the 1994 D.O.T. EMT Basic National Standard Curriculum nor available in current published EMT-B textbooks based on the NSC, the course instructor may consider modifying excerpts from this Instructor Manual for providing to students as printed reference material.

EMS Equipment:

Fluid filled I.V. bags of appropriate fluid
I.V. Primary tubing (macro and micro)
I.V. Secondary tubing (extension sets)
Various sizes of I.V. catheters (including butterfly type)
I.V. Arm (or suitable mannequin)
I.V. Arm Board (pediatric and adult)
Antiseptic wipes
Roller Bandages
Tapes
Suitable sterile dressings
Band-Aids
Gloves of various sizes
Sharps disposal container
Infectious materials disposal container

ASSOCIATED TERMINOLOGY

(Recommended that defined terms be provided as hand-out material to each student)
These terms are listed in the Appendix Section of this curriculum.

PRESENTATION:

Declarative (What)

Monitoring, maintaining, and discontinuing of a patient pre-established I.V.

I. Safety precautions

Review of safety precautions to be observed during the patient I.V. infusion Process

A. Protect the EMT-B and the patient from sources of infection by:
   1. Use of appropriate infection control techniques; Examples: The EMT-B uses as a minimum latex (or similar, acceptable substitute material) gloves and sterile dressings and bandages for controlling patient bleeding when an I.V. has been accidentally dislodged;
   2. Use of additional Personal Protective Equipment when needed;
      For example, in addition to the above, if other known conditions or symptoms are demonstrated by the caregiver or patient, incidental to the I.V. infusion (productive coughs, other body fluid exposures, etc.,) use of additional Personal Protective Equipment, such as a face mask or shield, or use of other barriers may be needed;
   3. Use of OSHA approved containers for disposal of infectious wastes; and
   4. Use of OSHA approved containers for disposal of sharps.

B. Report accidental sharps injuries, cuts, contact with blood, other body fluids or other potentially infectious materials in accordance with the Exposure Control Plan developed by your ambulance service or other EMS response organization.

II. Review of reasons for I.V. therapy

In order to provide:

A. Fluid to replace or maintain volume and electrolyte balance for losses due to conditions such as severe burns, traumatic injuries or other conditions that result in dehydration.
B. For the maintenance of an open vein.
C. Administration of medications by ALS personnel.

III. Infusion fluids, patient body part locations for I. V. administration, I.V. containers, drip sets and accessories most often encountered for ambulance transportation

A. I.V. Fluid Types and Body Part Preestablished Locations for I.V. Administration
   1. Prehospital Encounters
      a. The types of fluids being administered may be unlimited

b. The patient body part preestablished locations for I.V. administration may be unlimited

2. Interfacility (hospital to hospital ambulance transportation) Encounters
   a. The types of fluids shall be restrictive (reference the Interfacility encounters portion of this module)
   b. The patient body part preestablished locations for I.V. administration shall be limited to peripheral locations (reference the Interfacility Encounters portion of this module)
3. Facility (Hospital) to Home Encounters
   a. The types of fluids being administered may be unlimited if the initiating physician has deemed the patient to be in a stable condition and in addition to the I.V. care, all other patient care can be provided within the scope of practice of an EMT-B (reference the Facility (Hospital) to Home portion of this module)
   b. The patient body part preestablished locations for I.V. administration may be unlimited if the initiating physician has deemed the patient to be in a stable condition and in addition to the I.V. care, all other patient care can be provided within the scope of practice of an EMT-B (reference the Facility (Hospital) to Home portion of this module)

B. Containers and Drip Sets
   1. Plastic is the most common type of I.V. container material
   2. The most common I.V. fluid container sizes are 250, 500 or 1000 ml
   3. The most common I.V. fluid drip sets are macro and micro

C. Catheters and Needles
   1. The most common types of I.V. catheters encountered are the angiocatheter (commonly called “angiocath”) and the butterfly (so called because of its wing-like attachments)
   2. The most common sizes of catheters and needles used for administration of I.V. fluids are 14, 16, 18, 20 and 22 gauge (the smaller the gauge number, the larger the diameter of the opening)

NOTE* An accidental dislodging of a 14 or 16 gauge catheter from a patient’s vein is more apt to allow a greater flow of blood to control.

IV. Situations in a prehospital encounter where BLS personnel may be required to transport a patient with a preestablished I.V.

A. Patient being treated at home (e.g. place of residence which could include “boarding or nursing home”) for a medical problem by pharmacological intervention and requiring emergency ambulance transportation to a hospital;

B. Unstable patient requiring emergency ambulance transportation from a physician’s office, clinic, immediate care center, industrial site, or other location, at which an authorized person has preestablished an I.V. on the patient, to a hospital; or

C. Multiple casualty situation where there is insufficient number of Paramedics, Registered Nurses, or Physicians to accompany all patients to the hospital.

V. Assessment

A. The EMT-B shall perform the **initial** and **ongoing patient assessment** based on the medical or traumatic situation.

Note* The blood pressure <u>shall not be assessed in the arm in which the I.V. is infusing</u>, unless the individual is an amputee or there is another reason the other arm should not be utilized (e.g., injury, shunt, mastectomy)

B. The EMT-B shall obtain the following information relating to the I.V. prior to transportation:
   1. catheter type and size
   2. type of infusion solution being administered
   3. date and time of catheter and fluid establishment
   4. reason for fluid therapy
   5. prescribed flow rate

C. Inspect the I.V. site, fluid flow and rate prior to and during transportation for the following:
   1. Infiltration
      a. pain or tenderness at site
      b. redness or swelling at site
      c. decrease in rate (determined by counting drops)
      d. absence of blood into I.V. tubing if fluids placed below I.V. site
   2. Change of I.V. flow rate (indicated by decreased or cessation of flow of fluid) due to:
      a. kink in tubing
      b. arm is bent or there is external pressure at site (positioning problem)
      c. hematoma or clot has formed which obstructs opening in the catheter
      d. fluid container is not sufficiently elevated to allow the fluid to flow freely (positioning problem)
   3. Potential of air embolism (air present in tubing) due to:
      a. opening in I.V. system (tubing has been cut, connection between needle and tubing is loose or disconnected)
      b. fluid container is empty

4. Change of I.V. flow rate (indicated by significant increase or steady stream)
    a. control clamp on I.V. tubing accidentally manipulated (e.g. during transfer of patient from bed or chair to stretcher and loading into ambulance)
    b. positioning of I.V. infusion extremity

D. Trouble shooting for above indicated problems
1. Infiltration (flow of fluid into the tissue instead of vein)
    a. if signs and symptoms of infiltration are present and trouble shooting has been unsuccessful in correcting problem, contact on-line medical control
    b. prepare for discontinuation per protocol (discontinuation means only to close the control clamp)
2. Change of flow rate (decreased or ceased)
    a. raise the I.V. fluid container. (Gravity affects the flow. The container must be high enough to maintain the flow.)
    b. check the alignment of the extremity where fluid is infusing (If possible, placing the extremity in the correct position will facilitate flow. Reposition the extremity in various positions to determine if the inconsistency of the I.V. flow is a positional problem.)
    c. check the IV tubing for kinks that may reduce or stop flow (If found, attempt to straighten tubing.)
    d. if a., b. or c. above are unsuccessful, lower the fluid container slightly lower than the infusion site. You should see a backflash of blood (If there is no backflash the problem is internal and most likely a clot has formed at the opening of the catheter preventing the flow. You will need to contact medical control for further orders which may include discontinuation of the I.V. by closing the control clamp).
3. Air in tubing:
    a. if no contraindications, raise the extremity above the level of the heart
    b. contact on-line medical control for further orders which may include discontinuation of the I.V. by closing the control clamp
4. Change in flow rate (decreased):
    a. reference trouble-shooting techniques as described in D1 and D 2 above; and if not corrected
    b. discontinue the fluid flow by closing the control clamp.
5. Change in flow rate (increased):
    a. check control clamp to see if accidentally manipulated to the wide open setting; and
    b. discontinue the fluid flow by closing the control clamp.

NOTE: In each of the above cases, if the EMT-B feels that medical attention is needed for the patient, consideration should be given to contacting on-line medical control and diverting the patient to the nearest appropriate medical facility for consultation before proceeding to the original destination.

VI. Maintenance of the I.V. infusion in prehospital encounters (patient is transported by emergency ambulance from place of residence, or other emergency scene, to a hospital.

A. Ensure that there is adequate infusion fluid for the transport. This is the responsibility of the home caregiver who may accompany the patient to the hospital. When the fluid volume approaches 50 ml, it is the responsibility of the trained family member to add identical fluid to the infusion container. In exception, **if the EMT-B is working for an emergency medical service contracted with a physician medical director and the infusion fluid is limited to those addressed in the "Interfacility Encounters" portion of this curriculum, the EMT-B may be authorized to add identical fluid to the system**.

B. If discontinuation is necessary, the EMT-B is restricted to discontinuing the I.V. flow only by closing the control clamp.

NOTE* Refer to the limited fluids listed in the Terminology appendix (*Restricted Fluids) of this curriculum for the description of EMT-B procedures related to the maintenance of preestablished infusion fluids encountered in interfacility ambulance transportation.

VII. Discontinuing the patient infusion in the prehospital setting:

A. Review and perform trouble shooting techniques (unless fluid is down to amount specified by medical director protocol) in conjunction with observation of patient signs and symptoms, before considering discontinuation of the preestablished infusion.

B. If performance of trouble shooting techniques have been unsuccessful, contact on-line medical control, unless situation is covered under standing orders, before closing control clamp

1. Close the control clamp on the I.V. tubing;
2. Visually examine the I.V. site to verify that the catheter is still in place.
3. Do not remove the I.V. catheter.
4. Continue transporting the patient to the hospital.

NOTE* Ordinarily, discontinuation will not include removal of the catheter. However, if the catheter has accidentally become dislodged or the patient has overtly pulled the catheter from the vein, then the EMT-B will proceed with the following:

C. Procedure for controlling patient bleeding and disposing of soiled materials and sharps:

1. Gather supplies.
   a. Latex, or similar material, gloves for the EMT-B
   b. Sterile dressing and bandage (2X2 gauze, tape or Band-Aid)
2. Explain to patient what you are about to do.
3. Place sterile 2X2 gauze over the I.V. site.
4. Apply direct pressure on the I.V. site for 3-5 minutes, while concurrently closing the control clamp on the I.V. tubing.
5. Place a sterile dressing covered by tape, or a Band-Aid, over the I.V. site.
6. Dispose used or contaminated materials (blood soaked gauze, gloves, I.V. set, etc.,) into an OSHA approved container.

Note* Prior to disposing of the I.V. container and accessories, document the amount of fluid remaining in the container on the patient run report.

VIII. Situations when EMT-B shall contact on-line Medical Control

Included, but not Limited to the following:

A. Patient exhibits signs and symptoms of compromised airway, breathing, circulation or altered levels of consciousness; or
B. Patient exhibits signs and symptoms of red, itchy skin with possible appearance of rash-like whelps or bumps

IX. Documentation:

All of the following assessments and actions by the EMT-B shall be documented on the patient run report form.

A. Initial and ongoing patient assessment results during transportation;
B. Time of initiation of the I.V. infusion;
C. Type and amount of the infusion fluid in the container at the time of the I.V. initiation;
D. Flow rates according to physician orders;
E. If I.V. is discontinued **(remember, for the EMT-B discontinuation means <u>only</u> to close the control clamp**):
    1. time of discontinuation; and
    2. amount of fluid remaining in container at time of discontinuation.

X. EVALUATION

Written:

Develop evaluation instruments, e.g., quizzes, verbal reviews, handouts, to determine if the students have met the cognitive objectives of this lesson.

Practical:

Evaluate the actions of the EMT-B students during role-play, practice or other skill stations to determine their compliance with the cognitive objectives and their mastery of the psychomotor objectives of this lesson.

NOTE* Please reference examples in the Appendix of this module for suggestions in development of written and practical skill examinations.

XI. REMEDIATION

Identify students or groups of students who are having difficulty with this subject content. Develop and complete a remediation sheet for the identified students.

PART TWO

INTERFACILITY ENCOUNTERS
Hospital to Hospital Ambulance Transportation of the Patient
- (May be an Emergency or Nonemergency Ambulance Transport) -

AND

FACILITY TO HOME ENCOUNTERS
Hospital discharged Patient for Ambulance Transportation to Home
- (Nonemergency Ambulance Transport) -

Introduction

This portion of the curriculum Module is designed:

1. For the EMT Basic student when certified to practice:

   (a) Who will be working for **an ambulance service licensed at a minimum of the BLS level and the service <u>is required to have by written agreement a physician Medical Director</u>** in order for the EMT-B to perform interfacility and facility to home patient care and ambulance transportation of a patient with a preestablished intravenous (I.V.) infusion;

   (b) Who will respond to a request for interfacility or facility to home medical care and ambulance transportation of a patient who has a preestablished I.V. infusion;

   (c) Who learns that the presence of the preestablished I.V. may be incidental to the reason the patient requires medical care and ambulance transportation from an initiating to a receiving hospital, or after discharge from a hospital for ambulance transportation to the patient place of residence;

   (d) Who is provided with written verification that the initiating physician has determined that the preestablished I.V., which is limited to the infusion fluids addressed in this portion of the curriculum module, is beneficial to the patient and that the patient is stable enough that their needs, including and in addition to the I.V., can be met by BLS certified personnel during interfacility ambulance transportation or facility to home;

2. To clarify that although in prehospital or facility to home encounters, the location of the infusion site and types of infusion solutions may be unlimited, the <u>location</u> of the infusion site and types of I.V. infusion fluids for interfacility encounters shall be limited and shall not require a pump for administration;

3. To clarify that in interfacility encounters, the preestablished I.V. site and type of infusion solution shall be factors in whether or not the EMT-B shall be authorized to transport the patient from an initiating to a receiving hospital, and that the location, other than peripheral, of the infusion site, the deviation from the limited infusion solutions listed in the Terminology appendix (*Restricted Fluids) of this curriculum module, the requirement of a pump for administration of the infusion, or any other existing patient condition that requires ALS intervention shall be reasons for which an EMT-B shall not be authorized to care for and provide interfacility ambulance transportation of the patient;

4. To clarify that the initiating physician may allow unlimited patient body part locations of the infusion site and type of fluid being administered for a **hospital to home ambulance transportation** provided written evidence is provided to the EMT-B to verify that the patient is deemed by the initiating physician to be in a stable condition and that all needs of the patient can be met by BLS certified personnel. Additionally, the EMT-B advises the initiating physician that **the only intervention that may be made by an EMT-B regarding the I.V. in the event of adverse conditions occurring during a hospital to home ambulance transportation is to close the control clamp to stop the infusion flow**;

5. To provide instruction related to the monitoring, maintaining and discontinuing of the preestablished I.V. infusion during interfacility and facility to home encounters;

6. To clarify that maintenance of the infusion solution will include monitoring of the patient for signs and symptoms of an adverse condition and to perform trouble shooting techniques to attempt to correct the adverse condition;

7. To clarify that when the location and types of infusion fluid are limited to those addressed in the Terminology appendix (*Restricted Fluids) of this curriculum module and the service of employment is contracted with a physician Medical Director, an EMT-B shall be authorized to adjust the infusion fluid flow rate and add replacement fluid of identical type to the I.V. administration system in prehospital, interfacility and facility to home encounters of preestablished patient I.V. infusions;

8. To provide instruction in how to recognize the circumstances whereby it may be necessary to notify an on-line medical control physician for assistance and direction; and

9. To emphasize that **discontinuation of the I.V. means to only to close the control clamp** to stop the infusion flow **(the catheter shall not be removed by an EMT Basic)**.

OBJECTIVES:

Cognitive

In addition to meeting the cognitive objectives associated with the prehospital encounters portion of this module –

The EMT-Basic student shall be able to describe or list:

1. The difference between the terms prehospital, interfacility and facility to home patient ambulance transportation of a patient having a preestablished I.V.;
2. Three (3) types of infusion fluid, or combinations of the three, limitations for which the EMT-B is authorized to monitor, maintain and discontinue during an Interfacility ambulance transportation of a patient;
3. A basic formula for determining the calculations needed to readjust an I.V. fluid flow in accordance with attending physician orders;
4. Thirteen (13) steps in the process for adding identical replacement infusion fluid to an I.V. administration system; and
5. Three (3) steps associated with discontinuing a patient preestablished I.V. infusion.

Psychomotor

In addition to meeting the psychomotor objectives associated with the prehospital encounters portion of this module -

The EMT-Basic student shall be able to demonstrate:

1. When given a choice of selections in a classroom scenario, distinguish and provide an appropriate selection of preestablished patient I.V. solutions for which the EMT-B is authorized to monitor, maintain, and discontinue during an Interfacility ambulance transport;
2. Appropriate calculations required to determine the correct adjustment to change an I.V. infusion drop rate according to attending physician orders when given figures in a classroom scenario;
3. Appropriate techniques in the process of adding identical replacement infusion fluid to an I.V. administration system when given a classroom scenario for which it is appropriate for an EMT-B to perform these procedures; and
4. Appropriate techniques in the process of discontinuing an I.V. infusion when given a classroom scenario.

The preparation, work environment, personnel, minimum time to complete, and materials requirements are described at the beginning of the Prehospital Encounters portion of this curriculum.

As a reminder, an EMT Basic who performs procedures related to the monitoring, maintaining and discontinuing of a patient preestablished I. V. in Interfacility or Facility to Home ambulance transportation shall be working for an emergency medical service contracted with a physician Medical Director.

INTERFACILITY ENCOUNTERS

I. Ambulance Transportation and Care by an EMT Basic of a Patient with a Preestablished I.V.

A. Patient Status The care and treatment of the patient conditions, including and in addition to the preestablished I.V., are deemed by the initiating physician to be able to be met by Basic Life Support personnel. If Advanced Life Support (ALS) treatment is needed for the patient, either an ALS ambulance service shall provide the care and transportation, or the initiating hospital shall be responsible for sending hospital personnel to attend the patient's ALS care.

B. Patient body part locations for a preestablished I. V. shall be limited to peripheral sites in order for an EMT Basic to be authorized to transport the patient during an Interfacility encounter. Examples of peripheral (outer parts away from the trunk of the body) sites are:

1. Hands/Wrists
2. Arms
3. Legs/Ankles
4. Feet

NOTE* A **central line** is a preestablished I.V. that is located on or near the trunk of the body, most commonly found in the clavicle or shoulder area and less commonly in the groin area. For a critical care infant a preestablished I.V. may be established in the scalp and underlying areas, and the infant is usually transported in an **ALS** specialty care ambulance. For an interfacility transport, **the EMT Basic is not authorized** to provide care and ambulance transportation of a patient with a **central** preestablished I.V. infusion.

C. Types of Preestablished patient I.V. fluids for which an EMT-B shall be authorized to care for and provide ambulance transportation shall be limited to the following:

1. Saline (0.9% sodium chloride in water);
2. D_5W (a 5% solution of dextrose in water);
3. Lactated Ringer's solution; or
4. Any combination of saline, dextrose or Ringer's solution to which neither shall have had other additives included at the place of manufacture or at the initiating facility.

II. Contraindications during an Interfacility Encounter of a preestablished patient I.V. for which an EMT-B shall not be authorized to care for and provide ambulance transportation of the patient include the following:

A. The patient has one or more conditions other than the presence of a preestablished I.V. for which care and treatment of the patient requires ALS personnel;
B. The infusion site is other than peripheral;
C. The I.V. infusion solution is other than those addressed in the Terminology appendix (*Restricted Fluids) of this curriculum; or
D. A pump is required for the administration of the infusion solution.

III. Calculating Flow Rates.

When infusion fluids are limited to the ones referenced in the Terminology appendix (*Restricted Fluids) of this curriculum, flow rates may be adjusted by an EMT-B if necessary to conform to the initiating physician's orders, utilizing the following information:

A. Type of fluid to be infused;
B. Volume of fluid to be infused;
C. Length of time within which the fluid is to be given;
D. The drop factor of tubing set; and the
E. Formula: $\frac{\textbf{Flow Rate x Drop Factor}}{\textbf{Length of time (min)}} = \textbf{Gtts/min}$

Example: $\frac{90\text{cc/hr} \times 10\text{ gtts/ml}}{60\text{ min}} = 15\text{ gtts/min}$

IV. Addition of identical infusion fluid when 50ml, or the amount specified in the physician's orders, remain in existing container (**limited to the fluids referenced in the Terminology appendix [*Restricted Fluids] of this curriculum**)

ATTENTION: <u>This is an invasive procedure! Precautions regarding infection control by the EMT-B shall be followed</u>. The use of personal protective equipment and supplies (gloves and possibly a mask at minimum) shall be adhered to. <u>Contaminants on the skin, which may be of little consequence to the EMT-B, could cause a very serious patient infection if introduced into the patient I.V. infusion system</u>!

A. Check current physician I.V. orders;
B. Get new container of identical fluid type (must be limited to those referenced in the Terminology appendix [*Restricted Fluids] of this curriculum);
C. Examine the fluid container for clarity, expiration date, and fluid type;
D. Check integrity of container (absence of seam leaks or other questionable conditions);
E. Stop the fluid flow by closing the control clamp;
F. Removal of cover from entry port;
G. Invert old fluid container;
H. Remove tubing connector without touching the tubing end;
I. Remove the plastic sheath covering from the spike, which keeps the spike sterile.

Note* If the spike becomes contaminated after removal of the sheath during the preparation process for addition of identical solution, discard the administration set and start over with new tubing. **This infection control procedure is very important to follow in order to prevent unintentional introduction of disease producing organisms directly into the patient's circulatory system!**

J. Insert spike and tubing into the entry port of the I.V. administration system;
K. Invert new container and hang container on I.V. hanger;
L. Open line and allow flow of fluid; and
M. Adjust drop rate

V. Discontinuing a patient preestablished I.V. during an interfacility ambulance transportation

Follow the same procedures as referenced in Section VII of the Prehospital Encounters portion of this curriculum module.

VI. Situations when EMT-B shall contact on-line medical control

Reference Section VIII of the Prehospital Encounters portion of this curriculum module.

VII. Documentation

In addition to the items referenced in Section IX of the Prehospital Encounters portion of this curriculum module, enter the following on the ambulance run report form:

A. The adjusted I.V. fluid flow rate from the rate per minute in error, to the corrected rate as specified in the doctor's orders, if any readjustment was needed; and
B. If identical fluid was added:
    1. The time of discontinuation of the old fluid container;
    2. The amount of fluid remaining in the old container;
    3. The time the new container was started;
    4. The amount of fluid in the new container when started; and
    5. The flow rate established with the new container.

VIII. **EVALUATION**

Reference section X of the Prehospital Encounters portion of this curriculum module.

IX. **REMEDIATION**

Reference section XI of the Prehospital Encounters portion of this curriculum module.

FACILITY TO HOME ENCOUNTERS

OBJECTIVES:

Cognitive

Similar to those of the Interfacility Encounters portion of this curriculum Module, except that the body locations of the I.V. site and types of I.V. fluids may be unlimited.

Psychomotor

Similar to those of the Interfacility Encounters portion of this curriculum module, except readjustment of fluid flow rates or addition of identical fluid may be performed by an EMT-B only if the I.V. fluids are limited to those referenced in the Terminology appendix (*Restricted Fluids) of this curriculum.

I. Ambulance transportation and care by an EMT Basic of a patient with a preestablished I.V.

A. Patient Status: The care and treatment of the patient conditions, including and in addition to the preestablished I.V., are deemed by the initiating physician to be able to be met by Basic Life Support personnel. If Advanced Life Support (ALS) treatment is needed for the patient, either an ALS ambulance service shall provide the care and transportation, or the initiating hospital shall be responsible for sending hospital personnel to attend the patient's ALS care;

B. The I.V. site may be unlimited;

C. The types of I.V. fluid may be unlimited; however

D. For the EMT-B to make readjustment of the fluid flow rate or to add identical fluid, the type of fluids shall be limited to those referenced in the Terminology appendix (*Restricted Fluids) of this curriculum

II. Contraindications

Reference Section II. A and II. D of the Interfacility Encounters portion of this curriculum module.

III. Calculating Flow Rates

When fluids are limited to those referenced in the Terminology appendix (*Restricted Fluids) of this curriculum, then readjustment procedures may be performed by an EMT-B as referenced in Section III of the Interfacility Encounters portion of this curriculum module.

IV. Addition of Identical Fluids

When fluids are limited to those referenced in the Terminology appendix (*Restricted Fluids) of this curriculum, then addition of identical fluids may be performed by an EMT-B as for a Facility to Home encounter as referenced in section III of the Interfacility Encounters portion of this curriculum module.

V. Discontinuing a patient preestablished I.V. during an Interfacility ambulance transportation

Follow the same procedures as referenced in section VII of the Prehospital Encounters portion of this curriculum module.

VI. Situations when EMT-B shall contact on-line Medical Control
Reference section VIII of the Prehospital Encounters portion of this curriculum module.

VII. Documentation

In addition to the items referenced in section IX of the Prehospital Encounters portion of this curriculum module, enter the following on the ambulance run report form:

A. The adjusted I.V. fluid flow rate from the rate per minute in error, to the corrected rate as specified in the doctor's orders, if any readjustment was needed; and

B. If identical fluid was added:
   1. The time of discontinuation of the old fluid container;
   2. The amount of fluid remaining in the old container;
   3. The time the new container was started;
   4. The amount of fluid in the new container when started; and
   5. The flow rate established with the new container.

VIII. **EVALUATION**
Reference section X of the Prehospital Encounters portion of this curriculum module.

IX. **REMEDIATION**
Reference section XI of the Prehospital Encounters portion of this curriculum module.

SUMMARY TABLE

Transport Encounters	I.V. Site	Service Med. Dir. Required	Types of I.V. Fluids	Contraindica-itions to BLS Care
Prehospital	Unlimited	No	Unlimited	None
Interfacility	Peripheral	Yes	Limited to Saline, D_5W, Ringers (or combi-nation with no other additives)	Patient* conditions require ALS personnel
Facility to Home	Unlimited	Yes	Unlimited	Patient* conditions require ALS personnel

*The conditions may include types of solutions and routes of administration; and may include patient conditions in addition to having a preestablished I.V.

APPENDIX

EMT-BASIC CURRICULUM
MONITORING, MAINTAINING AND DISCONTINUING OF PREESTABLISHED PATIENT INTRAVENOUS INFUSIONS

PREHOSPITAL, INTERFACILITY AND FACILITY TO HOME ENCOUNTERS

TERMINOLOGY

1 ml	1 cc (one milliliter = one cubic centimeter)
Air Embolism	Accidental release of air into the circulatory system which may result in a myocardial infarction, stroke or even death.
Angiocatheter	"Angiocath" – A semi-flexible hollow tubing that fits over a needle through which fluids flow into a patient vein.
Backflash	The appearance of a patient's blood (small amount) in the I.V. tubing. This occurs when the solution bag/bottle is lowered to a level below the patient I.V. site and indicates that the I.V. line is not obstructed.
Butterfly Catheter	A type of angiocatherter having "wing-like" extensions to its structure
Cannula	A hollow needle used to punture a vein
Catheter	A hollow flexible tube, usually made of soft plastic or rubber, that can be placed in a body's vessel, cavity or organ for adding or taking away fluids.
Central I.V.	An I.V. that is inserted into the patient's central circulation. This is usually when a catheter has been inserted into the neck, chest or shoulder of the patient.
Circulatory Overload	A situation in which an excess overload volume of fluid entering the body creates excessive demands on the cardiovascular system.
D_5W	An I.V. solution of water that contains 5% Dextrose (a type of sugar). This is a very common I.V. fluid.
Drip Chamber	A clear reservoir located between an I.V. fluid container and the administration catheter/tubing that allows one to view the drops of I.V. fluid for determining the "drop rate".
Drop Factor	The number of drops per 1 ml that is delivered by an I.V. administration set (e.g. microdrip -vs- macrodrip).
Drop Rate	The number of drops per minute.
Gauge	Measurement of external diameter or thickness (as related to needles and catheters). The smaller the number the larger the external diameter.
gtt	Abreviation for "drop".

Infiltration	The leaking of I.V. fluid into the surrounding tissue. Also referred to as "extravasation".
Interfacility	Means emergency or nonemergency health care provided to a patient during ambulance transportation between two (2) health care facilities. As it relates to the care and ambulance transportation by an EMT-B of a patient with a preestablished I.V., this means between an initiating and a receiving hospital.
Intracath	A catheter that is inserted through a needle.
I.V.	Intravenous Infusion
I.V. Flow Rate	The rate (e.g. number of drops per minute) at which I.V. fluid is to be administered to a patient within a period of time as prescribed in the initiating physician's orders.
Lactated Ringers	An I.V. solution of water and salt containing electrolytes. This is considered the closest solution to matching the electrolytes found in body fluids.
Macro Drip	An I.V. administration set in which 10 or 15 drops administered equal a total volume of 1 milliliter.
Medical Control	This "On-Line" physician is usually an Emergency Physician Department physician to whom the EMT can contact directly via telephone or radio for purposes of obtaining medical direction. (On occasion this could be the ambulance service contracted physician Medical Director.)
Medical Director	An "Off-Line" physician who is affiliated by written contract to provide medical consultation and direction to the EMS Staff, but to whom direct telephone or radio contact is not always available. (Staff usually follow predeveloped written standing orders or protocols.)
Micro Drip	An I.V. administration set in which 60 drops administered is equal to a total volume of 1 milliliter.
Normal Saline	An I.V. solution of water that contains 0.9% Sodium Chloride.
Obstruction	Mechanical closure of in I.V. needle or catheter which will reduce or stop the flow of solution into the patients vein.
Patent	Indicates that an I.V. needle or catheter is properly within the vein and allowing for the proper flow of the I.V. fluid.

Peripheral I.V.	An I.V. that is inserted into a superficial vein of a patient's hand, arm, leg or foot.
Positional Flow Variation	Indicates that an I.V. is placed in a manner that causes the drop rate to vary with patient movement. This is not good.
Prehospital	Means emergency health care provided to a patient with a preestablished I.V. before and during emergency ambulance transportation from the patient's place of residence, doctor's office, clinic, or other external scene to a hospital.
Restricted Fluids	Types of preestablished patient I.V. fluids for which an EMT-B shall be authorized to care for and provide ambulance transportation shall be limited to the following: 1. Saline (0.9% sodium chloride in water) 2. D5W (a 5% solution of dextrose in water) 3. Lactated Ringer's solution 4. Any combination of saline, dextrose, or Ringer's solution to which neither shall have had additives included at the place of manufacture or at the initiating facility
Spike	A sharp pointed plastic device used to insert into the administration set port of an I.V. solution container. A plastic sheath covering the spike keeps it sterile. If the spike becomes contaminated after removal of the sheath (such as during the process to prepare for addition of identical solution), discard the administration set and start over with new tubing. **This infection control procedure is very important to follow in order to prevent unintentional introduction of disease producing organisms directly into the patient's circulatory system!**
Stable Patient	A situation in which the patient needs can be met within the scope of practice of an EMT-Basic (as defined by the medical director or medical control physician).
TKO or KVO	An abbreviation for "To Keep Open". These terms are interchangeable.

EVALUATION

Examples for Interfacility Encounters
(Similar examinations may be developed for the Prehospital and Facility to Home Encounters)

Written

At the end of this training module each student shall demonstrate competency related to the cognitive objectives by passing a written examination. The minimum passing score shall be established by the course instructor with approval of the EMS Educational Institution. Multiple choice questions may be developed to include but are not limited to the following enabling objectives. The EMT-B student shall be able to accurately identify among multiple choices:

1. The types of preestablished infusion solutions for which he is authorized to monitor, maintain and discontinue;

2. Patient conditions, signs and symptoms that may require I.V. monitoring, maintenance and discontinuance by ALS personnel, or may require monitoring and treatment of other patient conditions by ALS personnel;

3. Personal safety or infection control procedures to be followed while performing the maintenance and discontinuation of a preestablished peripheral I.V. infusion;

4. Types of patient assessment, care and treatment of a patient with a preestablished I.V. infusion;

5. The most common types and sizes of I.V. fluid containers;

6. The uses and differences between micro and macro administration sets;

7. The values needed to calculate the flow rate of the infusion solution to be maintained;

8. The procedures required for adjusting an infusion flow rate from provided data;

9. The procedures for adding identical solution to the I.V. infusion system;

10. Common causes and patient signs and symptoms that may indicate a need for the discontinuation of a peripheral preestablished I.V. infusion;

11. The procedure for discontinuing a patient preestablished I.V. infusion;

12. The procedural steps required for controlling bleeding and applying a sterile dressing to the wound when a patient preestablished I.V. catheter has become accidentally dislodged from the patient vein; and

13. Common causes and patient signs and symptoms that may indicate the need for notification of the medical director or online medical control physician.

Practical Skills

At the end of this training module each student shall demonstrate competency related to the psychomotor objectives by passing a practical skills examination. The minimum passing requirements shall be established by the course instructor with approval of the EMS Educational Institution. Scenarios may be developed to include but are not limited to allow demonstration of competency in the following enabling objectives. The EMT-B student shall demonstrate:

1. Acceptable control of a simulated scene and take or verbalize appropriate personal protective supplies and equipment to be utilized and other safety precautions to be considered before, during and after the monitoring, maintenance and discontinuing of a patient preestablished I.V. infusion;

2. Accurate determination, given a classroom scenario, of whether or not he is authorized to maintain the preestablished I.V. infusion;

3. Accurate determination, given a classroom scenario, of whether or not the patient's condition, signs and symptoms including and incidental to a preestablished I.V. may require monitoring and care by ALS personnel;

4. From provided data accurate evaluation of the I.V. solution flow rate and whether or not the flow rate needs adjusting;

5. Accurate evaluation of the I.V. solution flow rate after the patient has been moved from one level to another, as would be the case in moving the patient from the pick-up location to securing the patient and stretcher in the patient compartment of the ambulance and whether or not the flow rate needs adjusting;

6. Accurate flow rate adjustment after it is detemined that an adjustment is warranted;

7. Accurate procedures for adding identical solution to the I.V. infusion;

8. From provided data in a classroom scenario an identification of the common causes and patient signs and symptoms that may indicate a need for discontinuation of a preestablished I.V. infusion, accompanied by student verbalization related to this realization;

9. If the provided data indicates a need to do so, accurate discontinuation of a patient preestablished I.V. infusion;

10. Accurate procedures for controlling bleeding and applying a sterile dressing to the infusion entry site, when the provided scenario indicates the I.V. infusion catheter has become accidentally dislodged from the patient's vein;

11. From provided data, common causes, patient signs and symptoms that may indicate a need for the notification of the medical director or an on-line medical control physician and simulate medical control contact, accompanied by a student simulated method of physician contact, or student verbalization related to this realization; and

12. Accurate recording of required documentation before, during and after the monitoring, maintenance and discontinuation, if required, of a patient preestablished I.V. infusion.

SAMPLE **GUIDELINE** **SAMPLE**

For Development of

Form for Skill Station Evaluation

Interfacility (Hospital to Hospital) EMT-Basic care and ambulance transportation of a patient with a preestablished I.V. infusion

Please Print or Type:

_____	_____	_____	_____
Name of Student	Name of Training Agency	Location (City) in KY	Date

Time required to complete _____

Time used by student _____

NOTE* Training program develops scenarios for use at this station

	Possible Points	Points Awarded
Takes or verbalizes PPE/BSI	1	_____
Accurately determines that type and patient location of I.V. fluid acceptable for EMT-B care and transportation	1	_____
Accurately assesses whether or not patient condition, including and incidental to the I.V., requires monitoring and care by ALS personnel	1	_____
Accurately evaluates whether fluid flow rate is consistent with physician's orders	1	_____
Demonstrates accurate adjustment of fluid flow rate when determined to be inconsistent with physician's orders	1	_____
Demonstrates accurate assessment of whether there is a need to add identical fluid to the I.V. administration system	1	_____
Demonstrates accurate assessment of fluid to be added to the administration system (identical fluid; current expiration date; clear fluid, no cloudiness or particles, and fluid container has no leaks)	1	_____
Demonstrates accurate procedures, including infection control (PPE/BSI), for adding identical fluid to the I.V. administration system	1	_____
Demonstrates accurate trouble shooting techniques in attempt to correct the I.V. problem	1	_____

- **Over –**

Interfacility EMT-B care and ambulance transportation of patient with a preestablished I.V. (continued)

	Possible Points	Points Awarded
Demonstrates accurate assessment of need, by scenario, to consider discontinuation of preestablished I.V.	1	_____
Demonstrates accurate assessment of need, by scenario, to contact on-line medical control physician to discontinue the preestablished I.V.	1	_____
Demonstrates accurate procedures for bleeding control and application of sterile dressing to I.V. site when catheter has become accidentally dislodged from patient I.V. administration site	1	_____
Demonstrates accurate entry of documentation required before, during and after monitoring, maintenance and discontinuation , if needed, of a patient preestablished I.V.	1	_____
Total	14	_____

Minimum number of points required to pass skill station (% competency). In addition, no critical criteria not met Total 11? (whatever required points)

NOTE* If training program requires a minimum skill competence rating of 80% - (80% of 14 rounded to nearest whole number is <u>11</u>; if 90%, 90% of 14 = 12 minimum number of points required to pass)

Critical Criteria (Check only those not met)

_____ Did not take or verbalize PPE/BSI as required for procedures
_____ Did not accurately assess type of infusion fluid, I.V. site, or other patient condition requiring care and transportation by ALS personnel
_____ Did not accurately assess need to or provide accurate adjustment, if required, of I.V. fluid flow rate
_____ Did not perform accurate trouble shooting technique for I.V. problem
_____ Did not detect possible need, per scenario, to consider discontinuation of I.V.; or if detected followed inappropriate discontinuation procedure
_____ Did not accurately assess patient signs and symptoms, per scenario, that indicated a need to contact on-line medical control
_____ Did not meet critical criteria requirements within established time limit

[ ] Pass [ ] Fail

_____
Date

_____ _____ _____
Printed or Typed Name of Examiner **Signature of Examiner** **Cert. / License #**

REFERENCE MATERIAL FOR DEVELOPMENT OF THIS CURRICULUM

EMT-Basic Care and Ambulance Transportation of Patients with a Preestablished I.V. (Prehospital, Interfacility and Facility to Home)

Paramedic Care: Principles & Practice Bledsoe, Porter & Cherry / Brady Co. 2000